

AD-A162 368 AN ULTRASONIC DEVICE FOR SIGNAL PROCESSING(U) FOREIGN
TECHNOLOGY DIV WRIGHT-PATTERSON AFB OH
S V KULAKOV ET AL 15 NOV 85 FTD-ID(R5)T-1610-84

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AD-A162 368 AN ULTRASONIC DEVICE FOR SIGNAL PROCESSING(U) FOREIGN 1/1
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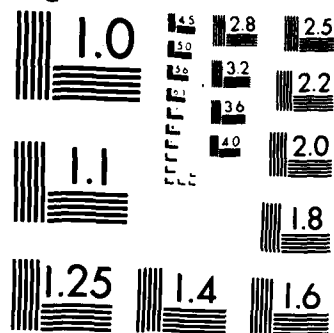
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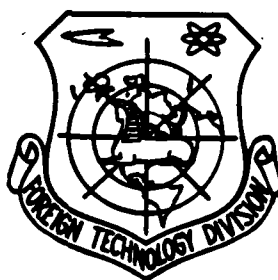
AN ULTRASONIC DEVICE FOR SIGNAL PROCESSING

by

S.V. Kulakov, A.G. Leks, et al.

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EDITED TRANSLATION

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15 Nov 85

MICROFICHE NR: FTD-85-C-001101

AN ULTRASONIC DEVICE FOR SIGNAL PROCESSING

By: S.V. Kulakov, A.G. Leks, et al.

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U. S. BOARD ON GEOGRAPHIC NAMES TRANSLITERATION SYSTEM

Block	Italic	Transliteration	Block	Italic	Transliteration
А а	<i>А а</i>	A, a	Р р	<i>Р р</i>	R, r
Б б	<i>Б б</i>	B, b	С с	<i>С с</i>	S, s
В в	<i>В в</i>	V, v	Т т	<i>Т т</i>	T, t
Г г	<i>Г г</i>	G, g	У у	<i>У у</i>	U, u
Д д	<i>Д д</i>	D, d	Ф ф	<i>Ф ф</i>	F, f
Е е	<i>Е е</i>	Ye, ye; E, e*	Х х	<i>Х х</i>	Kh, kh
Ж ж	<i>Ж ж</i>	Zh, zh	Ц ц	<i>Ц ц</i>	Ts, ts
З э	<i>З э</i>	Z, z	Ч ч	<i>Ч ч</i>	Ch, ch
И и	<i>И и</i>	I, i	Ш ш	<i>Ш ш</i>	Sh, sh
Й й	<i>Й й</i>	Y, y	Щ щ	<i>Щ щ</i>	Shch, shch
К к	<i>К к</i>	K, k	Ъ ъ	<i>Ъ ъ</i>	"
Л л	<i>Л л</i>	L, l	Ы ы	<i>Ы ы</i>	Y, y
М м	<i>М м</i>	M, m	Ь ь	<i>Ь ь</i>	'
Н н	<i>Н н</i>	N, n	Э э	<i>Э э</i>	E, e
О о	<i>О о</i>	O, o	Ю ю	<i>Ю ю</i>	Yu, yu
П п	<i>П п</i>	P, p	Я я	<i>Я я</i>	Ya, ya

*ye initially, after vowels, and after ъ, ы; e elsewhere.
When written as ё in Russian, transliterate as yë or ë.

RUSSIAN AND ENGLISH TRIGONOMETRIC FUNCTIONS

Russian	English	Russian	English	Russian	English
sin	sin	sh	sinh	arc sh	sinh ⁻¹
cos	cos	ch	cosh	arc ch	cosh ⁻¹
tg	tan	th	tanh	arc th	tanh ⁻¹
ctg	cot	cth	coth	arc cth	coth ⁻¹
sec	sec	sch	sech	arc sch	sech ⁻¹
cosec	csc	csch	csch	arc csch	csch ⁻¹

Russian English

rot curl
lg log

GRAPHICS DISCLAIMER

All figures, graphics, tables, equations, etc. merged into this translation were extracted from the best quality copy available.

AN ULTRASONIC DEVICE FOR SIGNAL PROCESSING

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Leningrad Institute of Aviation Instrument Design

The invention concerns the field of analog processing of the signals of phased antenna arrays in sonar and radar.

The ultrasonic signal processor announced in USSR Patent 319986 does not eliminate spurious signals.

In the present device, in order to remove spurious signals, the polygon is in the form of a piezoceramic plate, at one side of which the electrodes of a retransmitting array and the electrodes of a counting array are jointly deposited, while the edges of this side are covered with an absorber of ultrasonic surface waves.

The drawing shows the block diagram of the device.

The device consists of a multichannel frequency converter 1; a heterodyne 2; a re-transmitting array 3, the electrodes of which are deposited on the surface of the polygon 4, representing a

piezoceramic plate; a counting array 5, the electrodes of which are deposited on the same surface of the polygon at a distance from the re-transmitting array 3 equaling the focal distance of the converging wavefront of ultrasonic surface waves; an electronic commutator 6; an amplifier 7; a television-type indicator 8 and a synchronizer 9. A material 10 absorbing ultrasonic surface wave is deposited along the edges of the surface of the polygon where the re-transmitting and counting arrays are situated.

The proposed device works as follows.

Electrical signals from the elements of a linear phased antenna array are sent to the inputs of the multichannel converter 1, where a signal at the frequency of the heterodyne 2 is also applied. In the case of processing the signals of a radar linear phased antenna array the conversion is done by lowering the frequency to the processing frequency; while for processing the signals of a sonar linear phased antenna array the frequency is raised to the processing frequency.

The signals from the outputs of the multichannel frequency converter 1 are applied to the electrodes of the re-transmitting array 3, which excites ultrasonic surface waves on the surface of the polygon 4. Since the side bands of the converted signal retain the relative phases and amplitudes of the signals created by the electromagnetic (or acoustic in sonar) waves incident on the elements of the linear phased antenna array, as the ultrasonic surface waves are propagated they reconstruct the wavefronts of the waves reflected from the object and received by the linear phased antenna array.

The shape of the re-transmitting array 3 is chosen to assure converging wavefronts of the ultrasonic surface waves (e.g. in the form of a circular arc). This allows the electrodes

of the counting array 5 to be located in the focus of the converging ultrasonic surface waves.

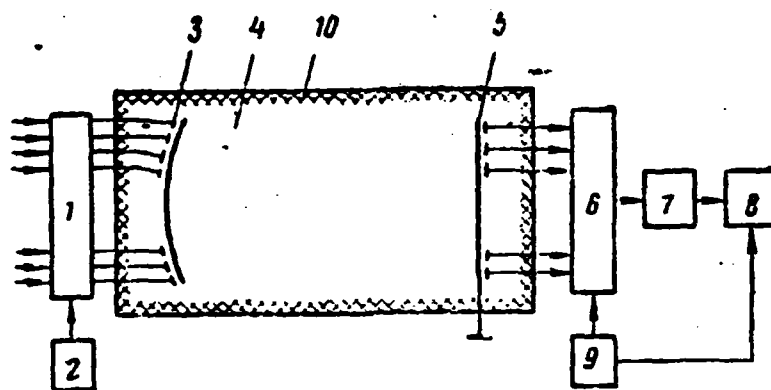
Depending on the angular coordinate of the object, the maximum of the pressure distribution of the ultrasonic surface waves occurs at a particular group of electrodes of the counting array 5, which converts this distribution into a distribution of electrical signals, which are sent to the inputs of the electronic commutator 6, which reads these electrical signals from the electrodes of the counting array. The electrical signal from the output of the electronic commutator is sent to the amplifier 7 and then to the television-type indicator 8.

The synchronizer 9 synchronizes the sampling periods of the electrodes of the counting array 5 and one sweep of the television-type indicator 8, e.g. a line. Another sweep of the indicator may be used to display the range coordinates.

The ultrasonic surface waves, propagating further beyond the counting array, reach the absorbing material 10, where they are totally quenched. This eliminates spurious signals that might be created from reflection of the waves from the edges of the polygon surface 4.

Patent Claims

An ultrasonic signal processor as per USSR Patent 319986, distinguished by the fact that, to eliminate spurious signals, the polygon is in the form of a piezoceramic plate, at one side of which the electrodes of a re-transmitting array and the electrodes of the counting array are jointly deposited, while the edges of this side are coated with an absorber of ultrasonic surface waves.



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 Remarks: _____

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